

## **Air Disc Brakes Performance and Maintenance**

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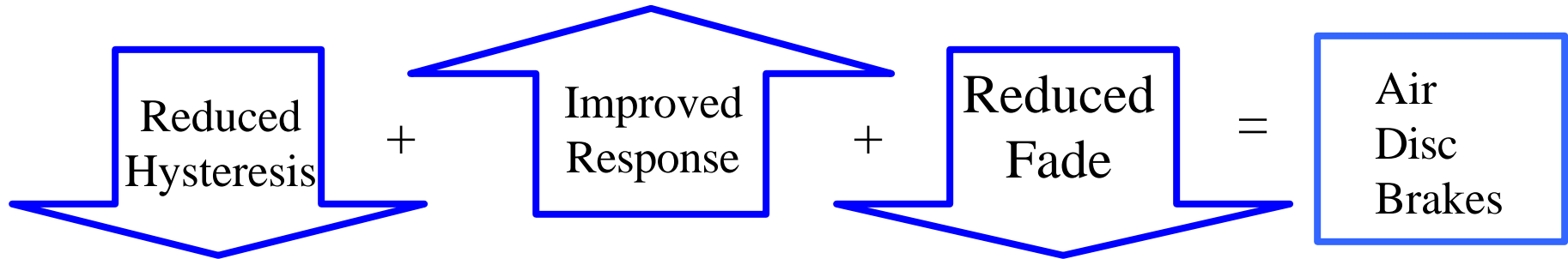
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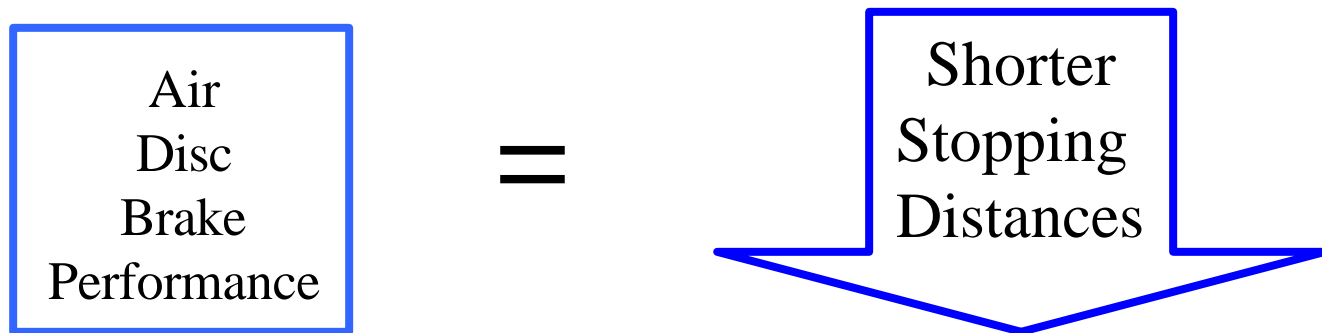
FAX: 440-329-9580



## Why Air Disc Brakes?



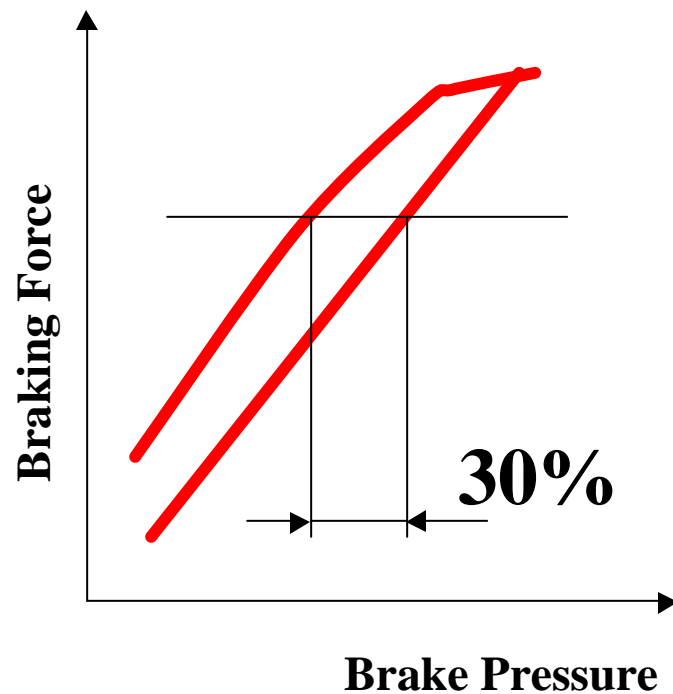
### Results



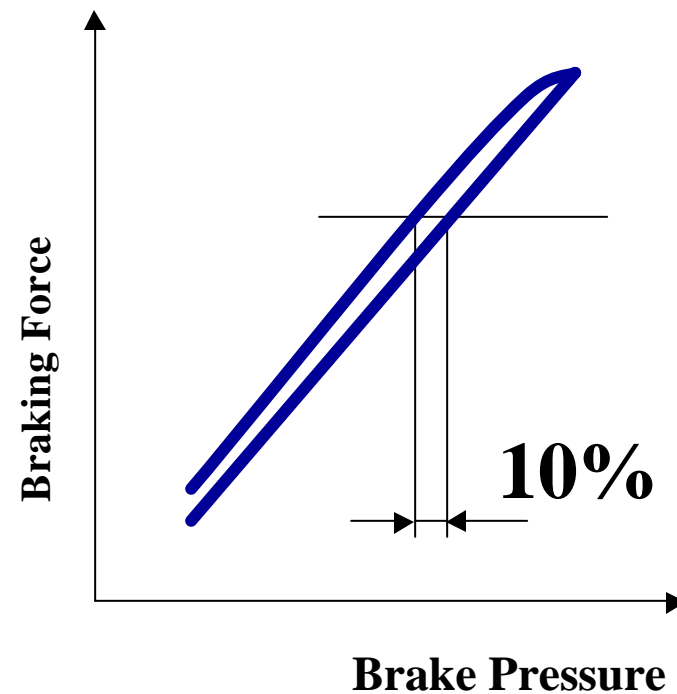
More Details to Follow

## Hysteresis

**Early Version Sliding  
Friction Disc Brakes  
(Power Screw)**



**New Generation  
Air Disc Brake**



## Brake Responsiveness



### S-Cam Brake

**30%** performance difference between left and right side



### Air Disc Brake

**10%** performance difference between left and right side

Air Disc Brake Provide Passenger Car Feel!



## Air Disc Brakes

## Test Vehicle Information

### Front Brakes:

- 15" X 4" Eaton S-Cam
- Type 20 Chamber
- 5.5" Auto Slacks
- Centrifuse Drums
- GAWR 12,000 Lbs.

### Rear Brakes:

- 16.5" X 7" Eaton S-Cam
- Type 30/30 Springbrakes
- 5.5" Auto Slacks
- Centrifuse Drums
- GAWR 40,000 Lbs.
- GCW 80,000 Lbs.

### Front Brakes:

- SB7000 Air Disc Brakes
- Type 24 Chamber
- 15.6:1 Ratio
- Ventilated Rotor
- GAWR 12,000 Lbs.

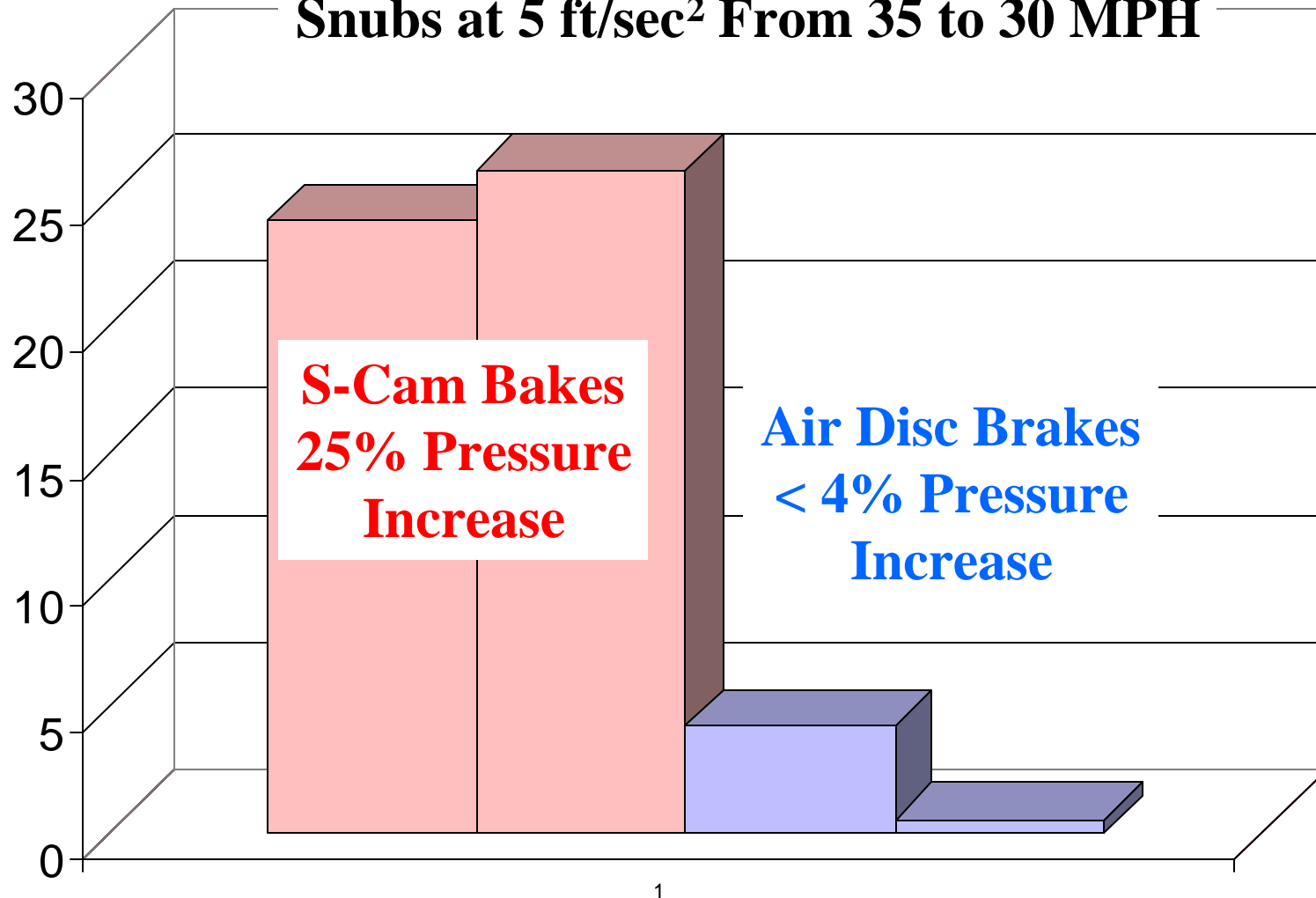
### Rear Brakes:

- SB7000 Air Disc Brakes
- Type 24/24 Springbrake
- 15.6:1 Ratio
- Ventilated Rotor
- GAWR 40,000 Lbs
- GCW 80,000 Lbs.

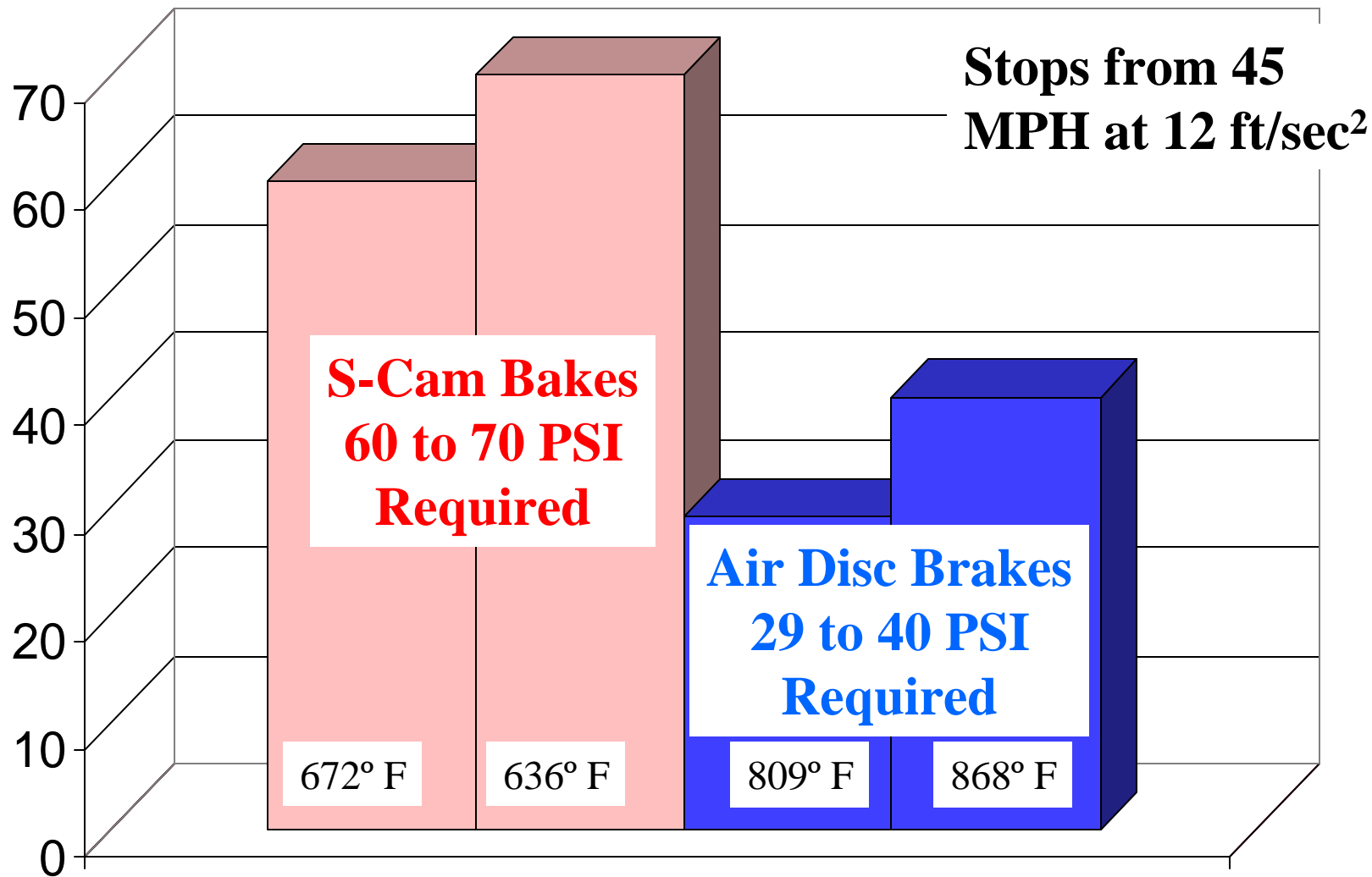
## Mountain Fade Testing

**I-70 West of Eisenhower Tunnel - 8 Mile 7% Grade**

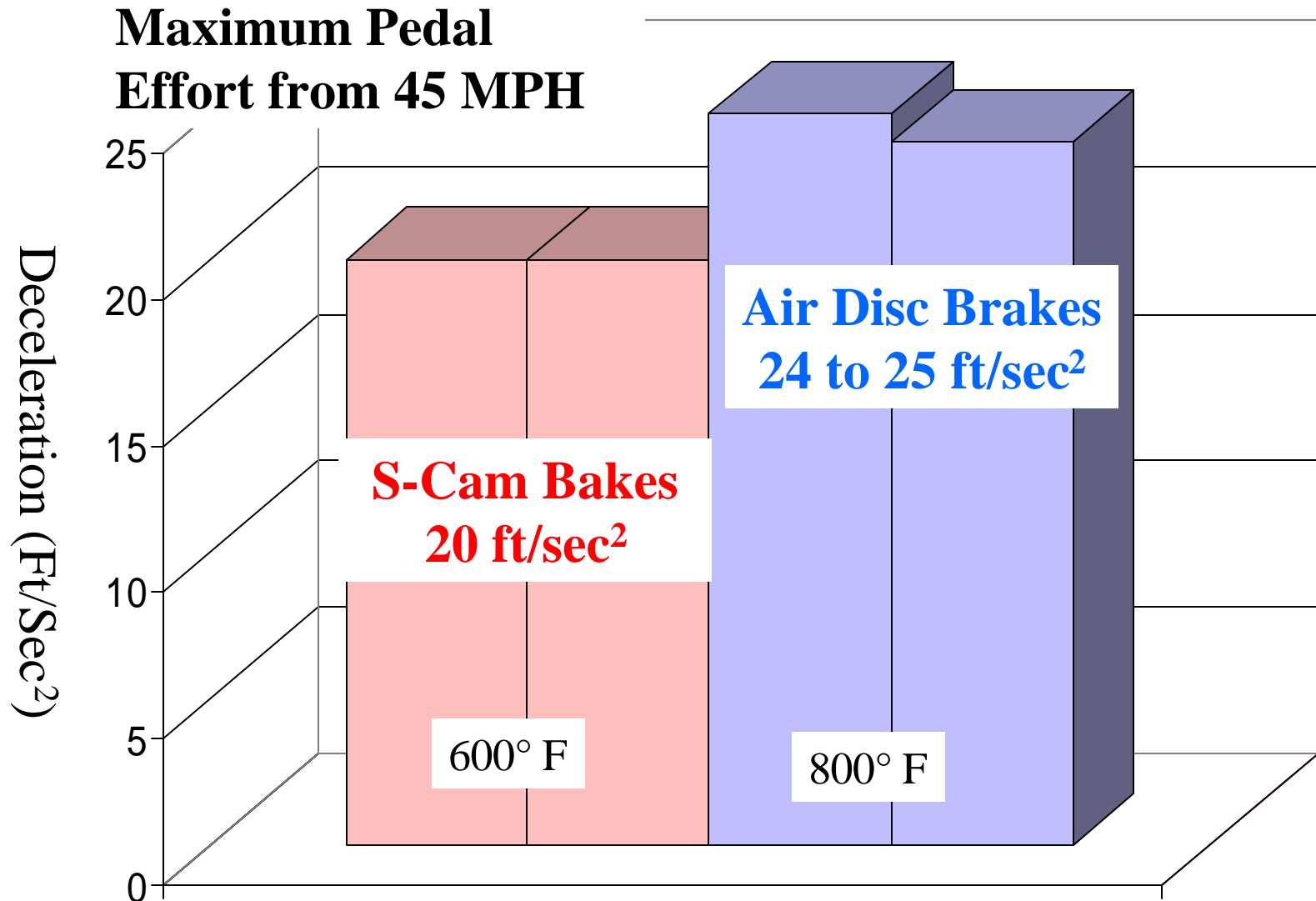
**Snubs at 5 ft/sec<sup>2</sup> From 35 to 30 MPH**



## Hot Brake Performance

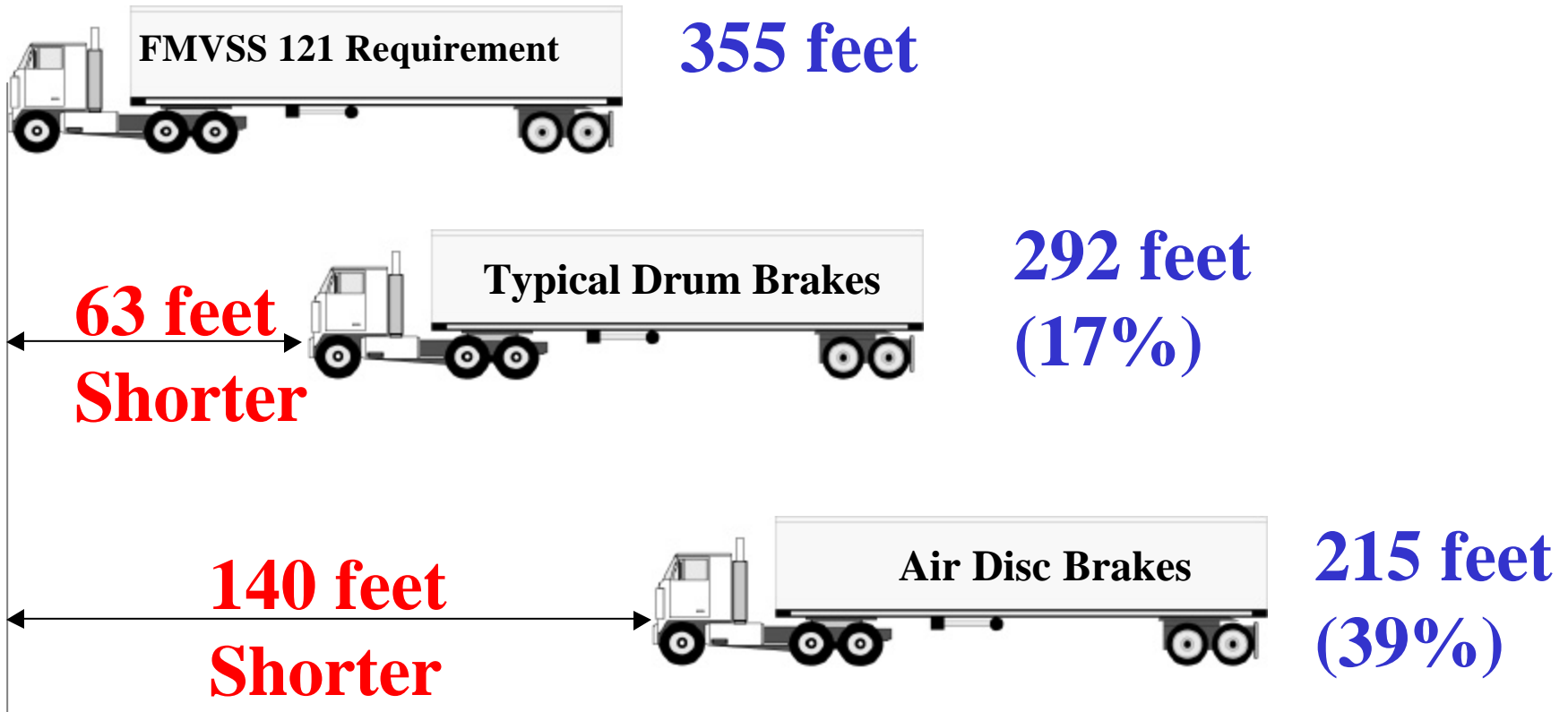


## Hot Brake Performance





## Stopping Distance From 60 MPH



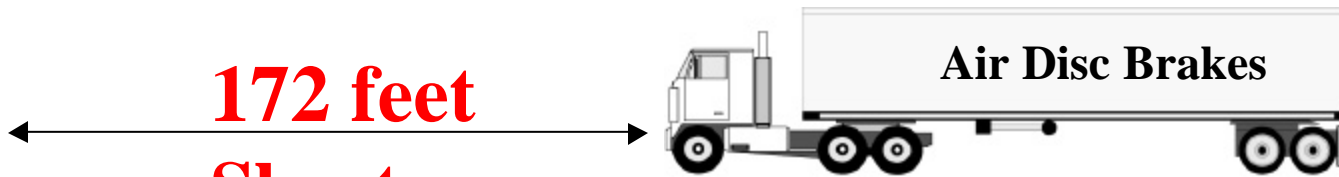
**GVW: 56,470 lbs. With non-braked control trailer**

## **Stopping Distance From 75 MPH**

### **No Requirement for Stopping Distance**



**517 feet**

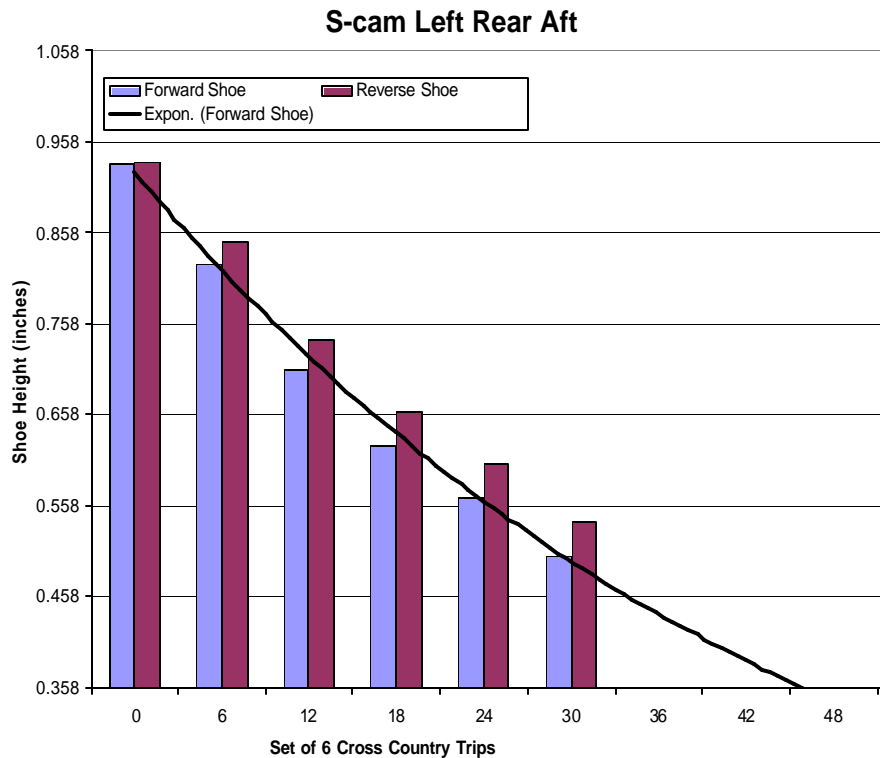


**172 feet  
Shorter**

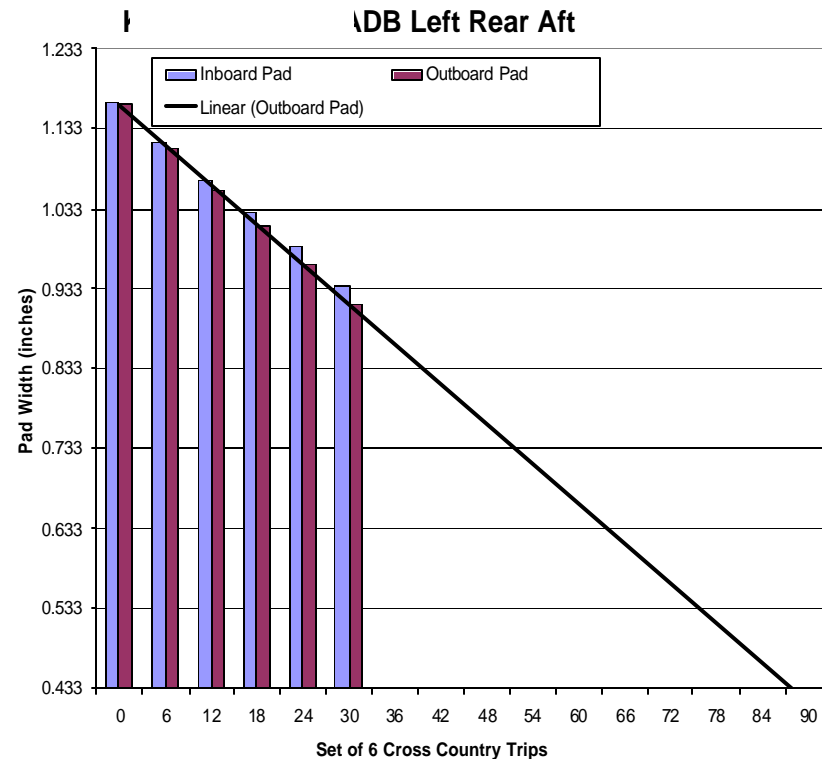
**345 feet  
(33%)**

**GVW: 56,470 lbs. With non-braked control trailer**

## Jennerstown Durability



**S-Cam Projected  
Full Worn at 48 Cycles**



**Air Disc Projected  
Full Worn at 90 Cycles**

**Air Disc Brakes - 87% Longer Life**

## **Air Disc Brakes Offer:**

- **Improved Brake Response - <10% Variation - Passenger Car Brake Feel**
- **Shorter Stopping Distances - 39% Shorter than Current Federal Requirements**
- **Improved Brake Fade Resistance - <4% Fade**
- **Excellent Hot Brake Performance**
- **Reliable Brake Performance - Cold or Hot**



**Air Disc Brakes - Improved Performance!**

## **Maintenance and Serviceability**

### **Air Disc Brakes**

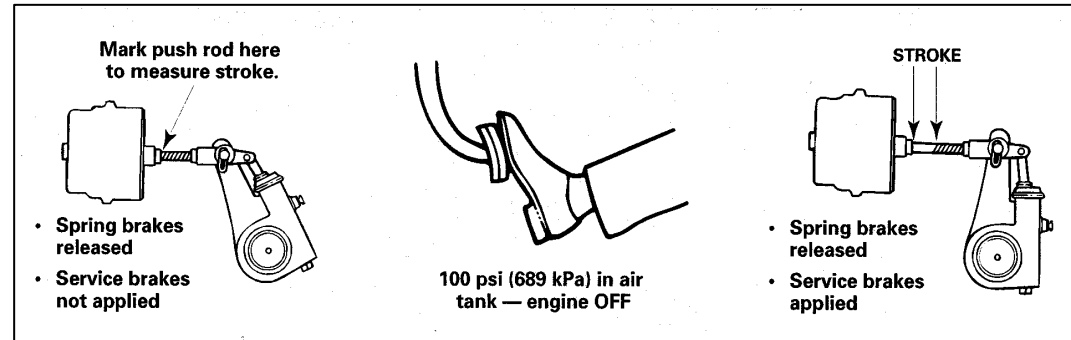
- Preventative Maintenance
  - Inspections
  - Lubrication
- Service
  - Reline Procedures
    - Parts Required
    - R&R times
  - Drum and Disc Replacement Procedures
    - Parts Required
    - R&R Times

## Preventative Maintenance

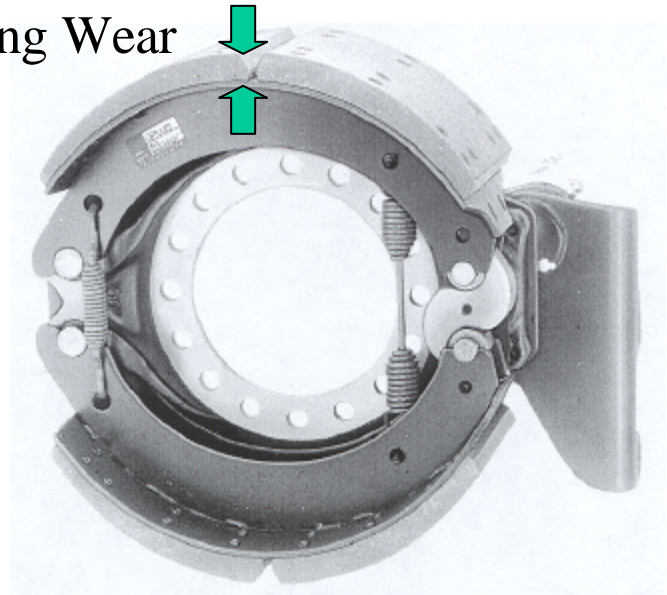
### Drum Brakes

- Inspections
  - Daily Pre-Trip
  - Brake Adjustment
  - Lining Wear
  - Loose or Worn Parts
- Lubrication
  - Every 50K to 100K miles
  - Every 6 months
  - Severe Duty - more often
  - Automatic Slack Adjuster
    - At fleet or chassis recommended interval 10 K to 25K
    - Every 6 months

### Check Brake Adjustment



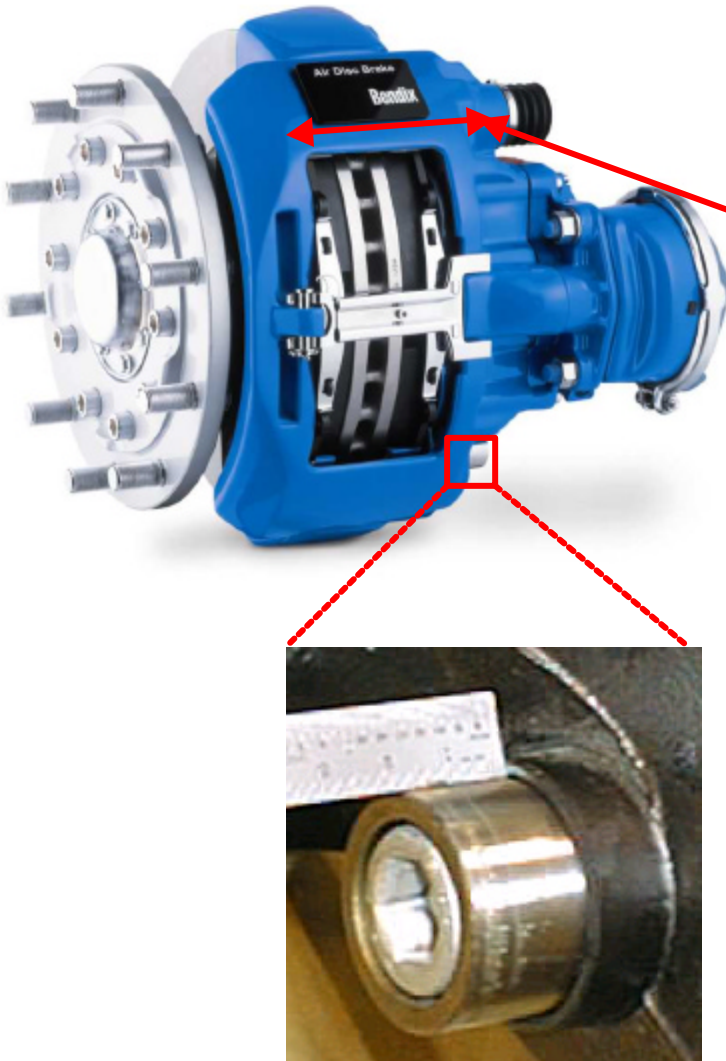
### Check Lining Wear



## Preventative Maintenance

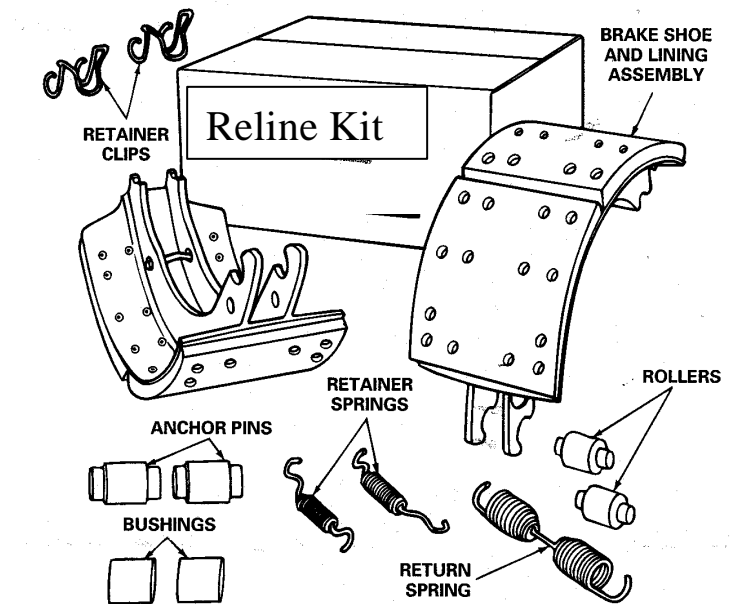
### Air Disc Brakes

- Inspections
  - Daily Pre-Trip
  - Brake Adjustment
    - Caliper Movement 2-mm
- Lining Wear
  - Floating Pin Location
  - 19-mm = new, flush = worn
  - Loose or Worn Parts
    - Caliper must slide freely
- Lubrication
  - None required - Internal mechanism sealed for life
  - Floatation mechanism upon inspections.



## Reline Procedures S-Cam Brakes

- Remove wheel and tires
- De-adjust brake if required
- Remove brake drum
- Remove rollers and clips
- Remove shoe return springs
- Remove shoe and linings and springs
- Remove anchor pins and bushings
- Inspect remaining parts.
- Install reline kit parts (13 to 22)
- Refinish drum or replace
- Replace wheel and tires



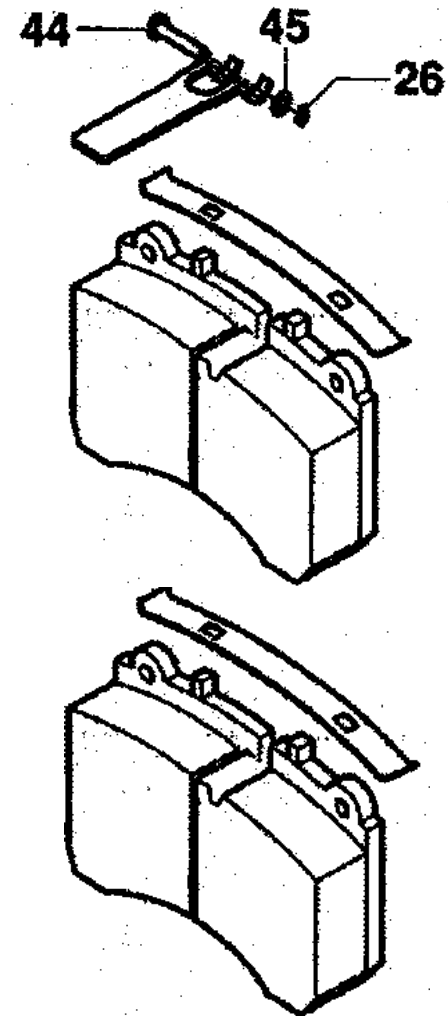
**R&R time 60 minutes per wheel**



## Reline Procedures Air Disc Brakes

- Remove wheel and tires
- De-adjust brake if required
- Remove pad retainer clip and pad retainer
- Remove pads.
- Install reline kit parts (8)
- Do not refinish rotor, replace if worn to minimum thickness
- Replace wheel and tires.

**R&R time 15 minutes per wheel**



## Brake Drum Replacement

Outboard mounted drum

- Only requires wheel removal
- Drum held on hub by wheel
- Easy replacement - most popular



R&R time 15 minutes/wheel

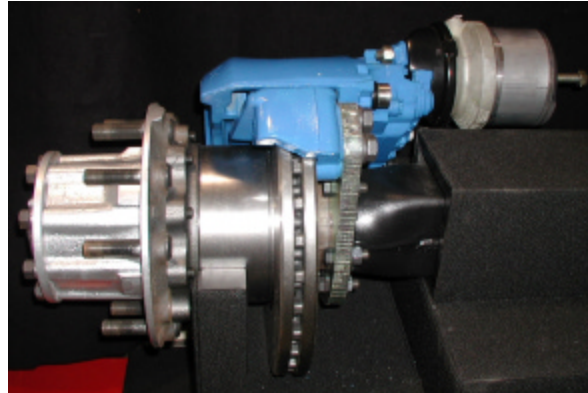
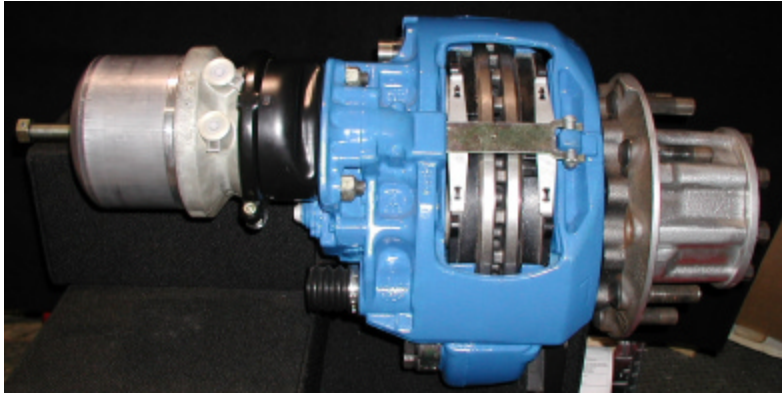
R&R time with wheel seal  
replacement 60  
minutes/wheel

Inboard mounted drum

- Requires removal of hub, wheel bearing and hub seals

R&R time 60 minutes/wheel

## Rotor Service

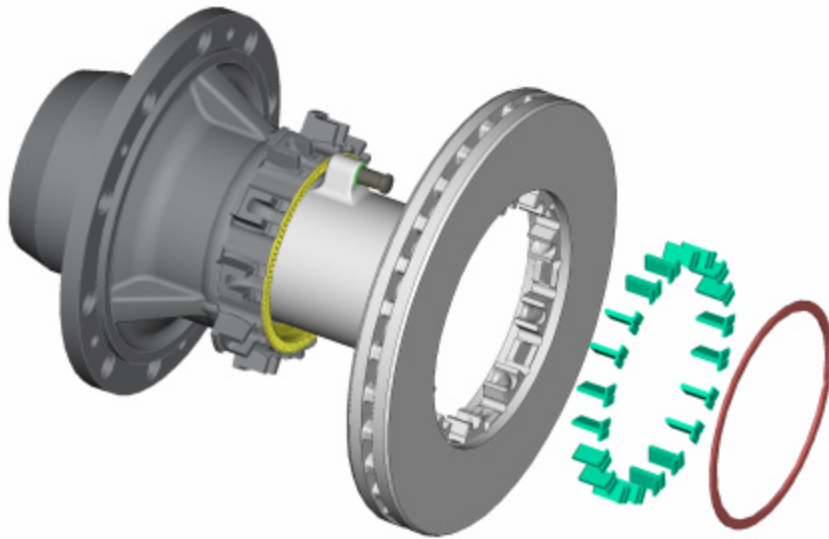


Current Conventional Rotor Servicing Requires:

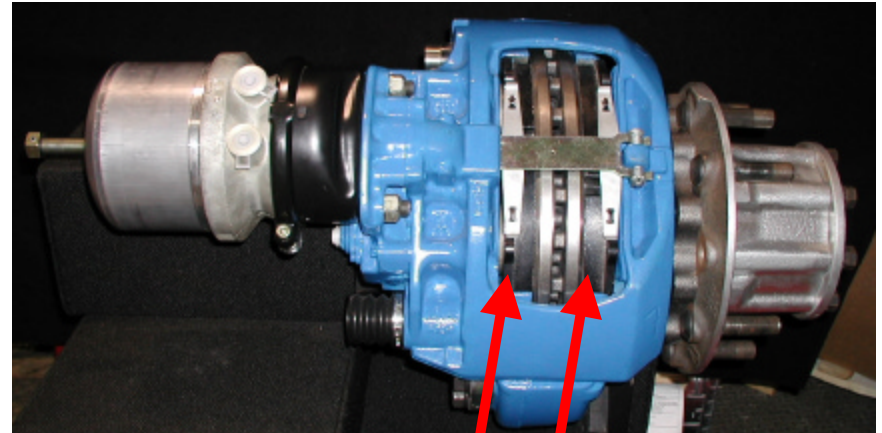
1. Removal of the Caliper and Carrier
2. Removal of Axle Shaft, Bearings and Hub.
3. Removal of the Rotor

**R&R time 60 minutes/wheel**

## New Splined Rotor Service



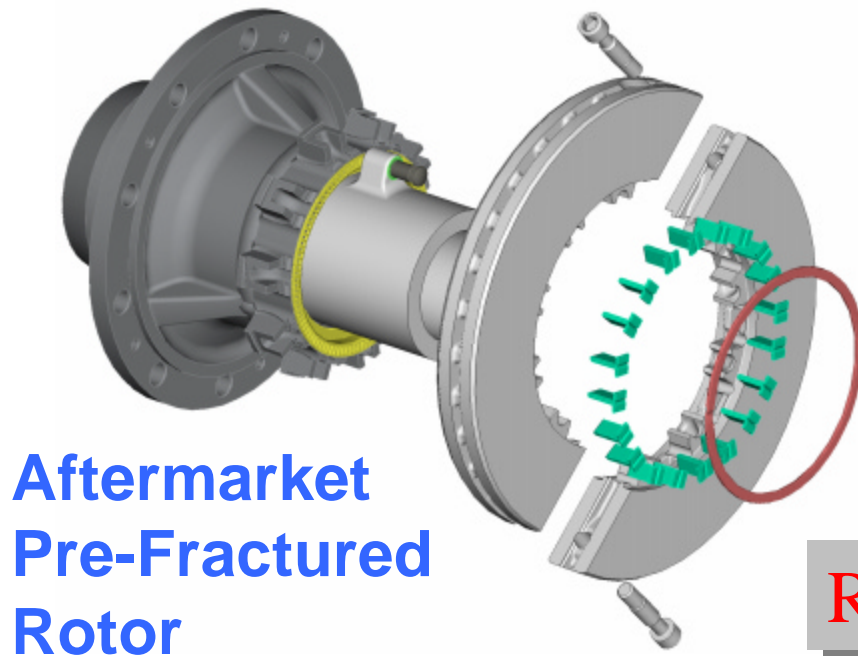
### OEM Installation



### Rotor Removal:

1. Remove Pads
2. Install Wedge Tools
3. Apply Brake and Fracture Rotor
4. Turn Rotor 180° and Fracture Other Side.

## New Splined/Split Rotor Replacement



### Rotor Replacement:

1. Install First Half of Pre-Fractured Rotor onto Splines and Rotate into Caliper.
2. Install Second half and Insert Two Bolts
3. Install Spring Shims and Clip Ring.
4. Install New Pads.

**R&R time 20 minutes/wheel**

- 66% Reduction in Maintenance Time
- Rotor Change Without Removing Caliper, Carrier, Bearing Set or Hub.



## Air Disc Brake Maintenance Summary

- Internal Automatic Adjustment
- Internal Mechanism Sealed for Life
- Common Parts on All Axles
- Reduction in Maintenance
  - Pad Replacement - 75%
  - Rotor Replacement - 66%
- Lower Life Cycle Costs



## **TMC BRAKE TECHNOLOGY TASK FORCE PRESENTERS**

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